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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,857	07/22/2003	Jun Koyama	740756-2633	6363

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EXAMINER	
SHAPIRO, LEONID	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/623,857	KOYAMA ET AL.	
	Examiner	Art Unit	
	Leonid Shapiro	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7-9,13,14,17 and 18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7-9,13,14,17 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-3,7-9,13-14, and 17-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sundahl et al. (Pub. No.: US 2004/0212573 A1) in view of Ishizuka (Patent No.: US 6,479,940 B1).

With respect to **Claim 1**, Sundahl teaches a display device comprising a display panel which is equipped with pixels including a light-emitting element *([0017], lines 1-2; light-emitting element: OLED emitters)*, an aging characteristic of the light-emitting element are stored *(See figure 3; [0023]; note that since the ratios of figure 3 are used to estimate the effective age of the device then aging characteristics of the light-emitting element must be stored; [0031], lines 5-7)*, an arithmetic operation unit *([0022], lines 4-12; note that the arithmetic operation unit is equivalent to the circuit used to measure current or voltage to maintain a desired level of luminance through reverse bias resistance; note the lighting period of a pixel is the time required to maintain the desired level of luminance, thus the arithmetic operation unit calculates a lighting period of each pixel)* which calculates a lighting period of each pixel, a count unit *([0027], note that the*

arithmetic operation unit also functions as a count unit, where the characteristic is measured continuously; note that the continuous measurement of the characteristic is equivalent to obtaining a cumulated lighting period; [0023], note that the measurement is used to identify a place on the curve of figure 3) which counts the lighting period to obtain a cumulated lighting period of each pixel using an output of the arithmetic operation unit, an A/D conversion circuit which converts detected data into digital data (paragraph 0046), and a correction unit *(See figure 4, the correction unit is equivalent to elements 420 and 430; [0032], lines 1-4; [0046], lines 16-24)* which corrects the video signal to be inputted to each pixel using the aging characteristic and the cumulated lighting period and supplies the corrected video signal to the display panel.

Sundahl does not explicitly teach a temperature detection unit which detects an ambient temperature, a storage unit in which a temperature characteristic of the light-emitting element is stored, and an arithmetic operation unit which calculates a lighting period of each pixel using an output of the temperature detection unit, the temperature characteristic, and a video signal.

Note that Sundahl shows that temperature also affects the degradation of luminance of the device *([0017], last four lines)* and multiple characteristics may be measured and/or combined to provide a more definitive indication of degradation and required correction than available from a single set of measurements *([0027], last four lines)*, which clearly suggest that temperature compensation can be used to overcome degradation.

However, Ishizuka teaches temperature compensation by having a temperature detection unit *(See figure 7, element 35; column 6, lines 52-54)* which detects an ambient temperature, a storage unit in which a temperature characteristic of the light-emitting element is stored *(column 6, lines 58-62; the temperature characteristic is equivalent to a predetermined temperature)*, and an arithmetic operation unit *(See figure 7, element 33B; column 6, lines 54-57)* which calculates a lighting period *(the lighting period is equivalent to the time for a pixel to emit light based on the supplied voltage)* of each pixel using an output of the temperature detection unit, the temperature characteristic, and a video signal.

Therefore it would have been obvious for a person of ordinary skill in the art at the time the invention was made to use the feature of temperature compensation where the measured temperature signal of Ishizuka is added to element 440 of figure 4 in the display device of Sundahl so as to produce a device that is able to compensate for both aging and temperature degradation to provide a display apparatus in which even in case of changing a display luminance of a light-emitting panel, the number of gradations which can be displayed is not limited and the luminance can be easily changed and a multi-gradation display with a high precision can be performed *(Ishizuka: column 2, lines 60-65)*.

With respect to **Claim 7**, claim 7 differs from claim 1 only in that claim 1 is a display device whereas claim 7 is a method claim. Thus, the method of claim 7 is analyzed as previously discussed with respect to the display device of claim 1.

With respect to **Claim 13**, claim 13 differs from claim 1 in that claim 13 does not recite the limitation "an arithmetic operation unit which calculates a lighting period of each pixel using an output of the temperature detection unit, the temperature characteristic, and a video signal". However, claim 13 recites the limitation "wherein the lighting period is corrected using the temperature characteristic and the ambient temperature" which is equivalent to the processing of the arithmetic operation unit and count unit of claim 1. Therefore claim 13 is analyzed as previously discussed with respect to the display device of claim 1.

With respect to **Claim 17**, claim 17 differs from claim 13 only in that claim 13 is a display device whereas claim 17 is a method claim. Thus, the method of claim 17 is analyzed as previously discussed with respect to the display device of claim 13.

With respect to **Claims 2 and 8**, a display apparatus according to claims 1 and 7, Sundahl teaches the arithmetic operation unit calculates an acceleration factor *([0023], note that the acceleration factor is equivalent to the ratios illustrated in figure 3 that are compared with the original current flow through the OLED)* and calculates the lighting period of each pixel from a multiplication of the video signal and the acceleration factor *(note that the equation in [0023], where V/V_o is equivalent to the acceleration factor and I_o is equivalent to the video signal)*.

temperature detection unit and the temperature characteristic

3. **Claims 3, 9, 14, and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sundahl and Ishizuka as applied to claims 1, 7, 13, and 17 above, and further in view of Miyashita et al. (Patent No.: JP361261921A).

With respect to **Claims 3, 9, 14, and 18**, a display device according to claims 1, 7, 13 and 17, Sundahl mentions that temperature may accelerate the degradation of the display device *([0017]; last four lines)*, thus measuring the reverse bias resistance of the OLED is equivalent to having a temperature detection unit that is a light-emitting element.

For further supplemental support Miyashita teaches having a temperature characteristic being reverse to a characteristic of the light emitting output of the light emitting element and an ambient temperature *(abstract)*, which is equivalent to a temperature detection unit that is a light-emitting element.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to use a light-emitting element as a temperature detection unit, as taught by Miyashita, to the display device of Sundahl, so as to provide a low cost temperature detection unit and to provide constant output from the light emitting element.

Response to Arguments

4. Applicant's arguments filed 07/16/07 have been fully considered but they are not persuasive:

On page 7, 1st paragraph of Remarks, Applicant's stated that Applicants submit that Sundahl et al. fails to disclose, teach or suggest an arithmetic operation unit, a count unit, an A/D conversion circuit which converts detected data into digital data, and a correction unit in the manner recited in independent claims 1, 7, 13 and 17, as amended. Specifically, with the invention recited in independent claims 1, 7, 13 and 17, as amended, the arithmetic operation unit, the count unit, and the correction unit, calculate a lighting period, count a cumulated lighting period, and correct a video signal. However, Sundahl teaches a display device comprising a display panel which is equipped with pixels including a light-emitting element *([0017], lines 1-2; light-emitting element: OLED emitters)*, an A/D conversion circuit which converts detected data into digital data (paragraph 0046), an aging characteristic of the light-emitting element are stored *(See figure 3; [0023]; note that since the ratios of figure 3 are used to estimate the effective age of the device then aging characteristics of the light-emitting element must be stored; [0031], lines 5-7)*, an arithmetic operation unit *([0022], lines 4-12; note that the arithmetic operation unit is equivalent to the circuit used to measure current or voltage to maintain a desired level of luminance through reverse bias resistance; note the lighting period of a pixel is the time required to maintain the desired level of luminance, thus the arithmetic operation unit calculates a lighting period of each pixel)* which calculates a lighting period of each pixel, a count unit *([0027], note that the arithmetic operation unit also functions as a count unit, where the characteristic is*

measured continuously; note that the continuous measurement of the characteristic is equivalent to obtaining a cumulated lighting period; [0023], note that the measurement is used to identify a place on the curve of figure 3) which counts the lighting period to obtain a cumulated lighting period of each pixel using an output of the arithmetic operation unit, and a correction unit *(See figure 4, the correction unit is equivalent to elements 420 and 430; [0032], lines 1-4; [0046], lines 16-24)* which corrects the video signal to be inputted to each pixel using the aging characteristic and the cumulated lighting period and supplies the corrected video signal to the display panel.

On page 7, last paragraph of Remarks, Applicant's stated that the arithmetic operation unit (element 33B) of Ishizuka merely adjusts the light adjustment signal for compensating temperature dependency of the light emission characteristics and not for compensating deterioration caused by temperature change. Thus, the arithmetic operation unit (element 33B) of Ishizuka fails to cure the noted deficiencies in Sundahl et al. and fails to teach or suggest arithmetic operation unit of the invention recited in independent claims 1, 7, 13 and 17, as amended. However, Sundahl et al. reference teaching compensating deterioration caused by temperature change by an aging characteristic of the light-emitting element are stored *(See figure 3; [0023].* In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Telephone Inquire

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 571-272-7683. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS
09.18.2007

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